

IN THE DRAWINGS:

In Figures 5, 6, 9, 10 and 11 the “(%)” sign as found in each x-axis headings of the drawings is deleted and in Figures 5, 6 and 9, the word "ratio" is spelled correctly. Further, Figures 1-3 are revised to include the legend “PRIOR ART”. Corrected drawings are submitted by separate letter to the draftsman.

REMARKS

By this amendment, claims 1, 6, and 11-13, drawings, and specification have been amended, and claims 2, 7, 8, and 10 have been canceled to place this application in condition for allowance. Currently, claims 1, 3-6, 9, and 11-13 are before the Examiner for consideration on their merits.

In review, the specification has been revised to address the informalities noted on paragraph 5 of the Office Action. In addition, the specification has been amended to be consistent with the change to the claims in terms of the identification of the different pipes. Also, the specification has been revised to remove the “%” sign in connection with the expanding ratio since the ratio is not in terms of percent. Rather, the value associated with the various ratio are multiplied by 100, and thus are not a percentage. This change also responds to the Examiner’s rejection under 35 U.S.C. § 112, first paragraph, and it is respectfully submitted that the specification is now fully enabling. The bracketing in the formulas has also been removed in the specification.

The drawings have also been corrected by insertion of the prior art legends in Figures 1-3. The drawings have also been revised to remove the “%” sign therefrom.

Claim 1 has been revised to remove the bracketing, and clarify the method step and use of three pipes as suggested in the Office Action.

In light of the changes made to the specification, claims, and drawings, it is submitted that all of the informalities identified in the outstanding Office Action have been addressed, and all objections/rejections should be withdrawn.

Applicants also acknowledge the restriction requirement and election of the Group 1 invention. The non-elected claims are canceled, and Applicants reserve the right to file one or more divisional applications thereon.

Turning to the prior art rejection, the Examiner has taken the position that United States Patent No. 6,532,995 to Asahi et al. (Asahi) establishes a *prima facie* case of anticipation against claims 1, 3-5, and 9. More particularly, the Examiner contends that any expansion of the pipe of Asahi would meet the claim limitations, particularly since E0 is not defined.

A similar position is taken in the rejection of claims 1 and 6 based on United States Patent No. 4,483,399 to Colgate.

In review, claim 1 has been revised to include the definition of E_0 in the claim. This amendment alone overcomes the rejections based on 35 U.S.C. § 102(b). Neither Asahi nor Colgate suggests a steel pipe that meets the expression 1 of claim 1 using the defined expressions of 2 and 3. Consequently, the Examiner must withdraw the rejections based on 35 U.S.C. § 102(b).

The only basis for a rejection in light of the amendment to claim 1 would be under 35 U.S.C. § 103(a). Regardless of whether the Examiner has a basis to allege that expanding the pipe to meet the claim relationship is prima facie obvious, the specification clearly demonstrates the criticality of meeting expression 1. This criticality effectively rebuts any allegation of obviousness and claim 1 is patentable over the applied prior art.

The end result of satisfying the expression 1 of $E_0 \leq 30 / (1 + 0.018\alpha)$ is an avoidance of the lowering of the collapse strength of the expanded pipe. In review, the inventors realized that the prior art method of embedding and expanding as described on pages 2 and 3 of the instant specification caused a lowering of the collapse strength and bending of the pipe. This is caused by the wall thickness of the pipe not being uniform in cross section, and the different thicknesses of the pipe react differently during the expanding process. The thinner sections, when expanded, are subjected to a different working ratio and therefore collapse strength suffers. Also, the different thicknesses result in different expansions, and subsequently different amounts of shrinkage occur in the longitudinal direction of the pipe. The varying shrinkage can cause bends in the pipe.

By abiding by the expression 1 of claim 1, the lowering of the collapse strength is avoided. The Examiner's attention is drawn to Table 2 and Figure 6. Table 2 shows the four tested alloys and various scenarios for each alloy. For example, alloy A uses three different values for α , and this results in three different values for the expression $30 / (1 + 0.018\alpha)$. Comparing E_0 to the expression reveals that when E_0 is less than the expression, excellent collapse strength is realized, measured in terms of the ratio C_1/C_0 . As one example, the steel A with an expanding ratio of 10 shows a C_1/C_0 ratio of 0.98 when its E_0 is 5.4, which is smaller than the value defined by the expression $30 / (1 + 0.018\alpha)$. In contrast, the C_1/C_0 is 0.76 when the E_0 exceed the $30 / (1 + 0.018\alpha)$ value. In general, in tests where E_0 was greater than the expression $30 / (1 + 0.018\alpha)$, collapse strength ratio was consistently less than 0.8 and unacceptable.

The improvements in collapse strength by abiding by the expression 1 in light of expressions 2 and 3 of claim 1 are totally unexpected in the art. Neither Asahi nor Colgate makes any mention of such a result. In fact, neither of these references is concerned with problem faced by the inventors, and there would be no way to ever arrive at the invention via their teachings. The mere fact that Asahi or Colgate speak of expanding a pipe does not lead one of skill to the control of the expansion as detailed in claim 1.

Any further allegation that Asahi or Colgate establish obviousness can only be the hindsight reconstruction of the prior art in light of Applicants' disclosure, and such a stance on the part of the Examiner could not be sustained on appeal. Even if Colgate and Asahi were combined, the two together still fail to show the importance of the expression 1 in controlling collapse strength, and the two cannot render claim 1 obvious.

To summarize, the showing in the specification clearly establishes a criticality of the expression 1, and this criticality supports Applicants' contention that claim 1 is patentable over the applied prior art of Asahi and Colgate.

Since claim 1 is unobvious, its dependent claims 2-6, 9, and 11-13 are also patentably distinguishable from the applied prior art based on their dependency.

Accordingly, the Examiner is requested to examine this application in light of this response and pass all pending claims onto issuance.

If the Examiner believes that an interview with Applicants' attorney would be helpful in expediting prosecution of this application, the Examiner is requested to telephone the undersigned at 202-835-1753.

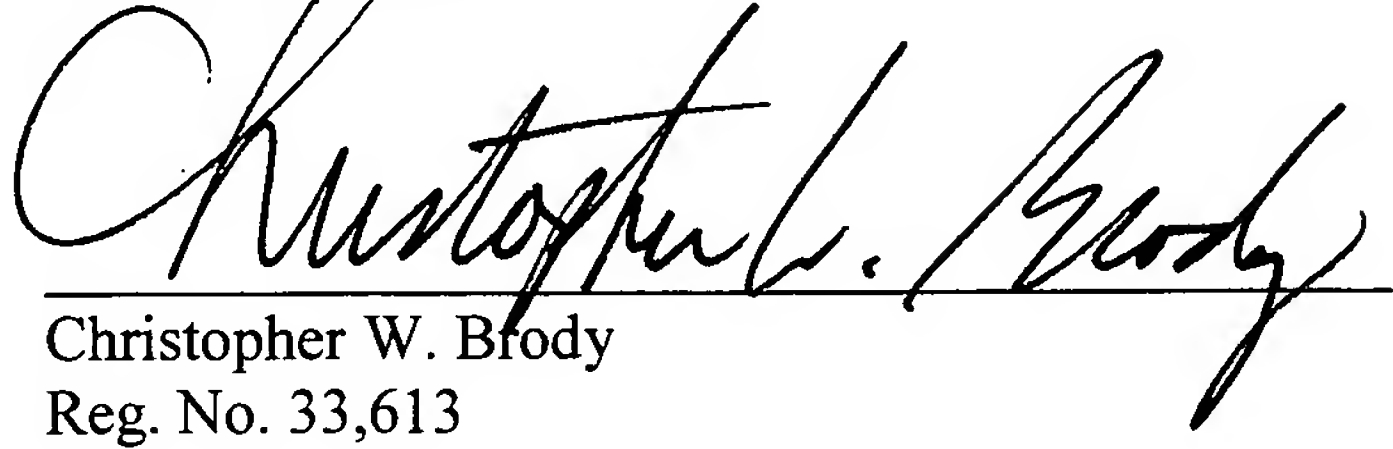
The above constitutes a complete response to all issues raised in the Office Action dated March 10, 2005.

Again, reconsideration and allowance of this application is respectfully requested.

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Please charge any fee deficiency or credit any overpayment to Deposit Account No. 50-1088.

Respectfully submitted,
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